Thought Question

Participants are asked to study a set of word pairs. In one condition (A) they are asked to decide for each pair whether the words are presented in alphabetical order (e.g., happy - delighted; NO). In another (B) they are asked to decide whether the words have similar meaning (e.g., happy - delighted; YES). They are then given two tests. In TEST 1, they are provided the first word of the pair and asked to recall the second. In TEST 2, they are given a word stem completion task (e.g., “fill in d_________ with the first word that comes to mind”). What pattern do you expect to see?

“Seven Sins” of Memory (Schacter)

- Absent-mindedness (fail to encode)
- Transience (decay)
- Blocking (failure to retrieve)
- Misattribution (mix up parts)
- Suggestibility (make up information)
- Bias (distort to fit preconceptions)
- Persistence (can’t stop recalling)

Misattribution

- A single memory has many parts that must be brought together at retrieval.
  - **contents** of memory (information to be remembered)
  - **source** of memory (context; where information came from)
  - **fluency/familiarity** (how easily information comes to mind)
- Failure to correctly put those parts together can result in **misattributions**.

Misattribution

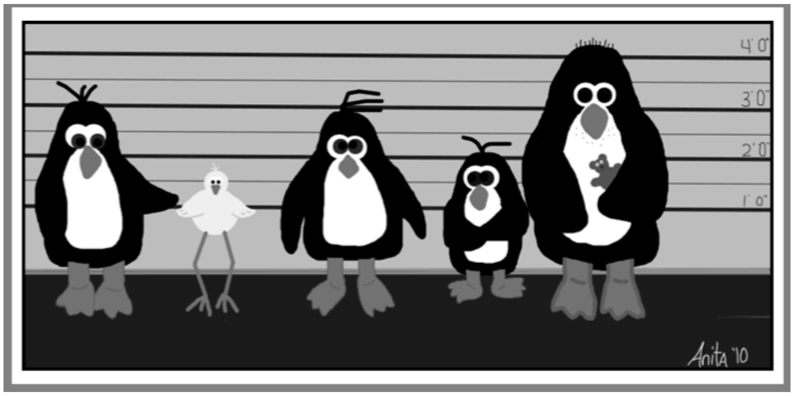
- Already have seen misattribution when talking about implicit memory.
- Tendency to misattribute fluency -- ease of processing -- with prior exposure.
  - Experiment: subjects study a list of words. At test, get those words and new ones as endings of sentences. Must say “old” or “new”.
  - Tend to misclassify predictable new endings (“The stormy seas tossed the BOAT”) as old.
- This tendency to has been suggested as an explanation for déjà vu.

Misattribution and eyewitnesses

- Lots of examples where tendency to misattribute fluency/familiarity results in eyewitness misidentification.
  - suspect was seen in an innocent context by eyewitness.
  - witness knows the person is familiar, doesn't know why, and assumes relation to the crime.
  - has even happened for people only seen on TV!

Misattribution and eyewitnesses

- Standard police line-ups particularly bad for this -- people pick "most familiar" person.



Familiarity misattribution: a famous example

- After Oklahoma City bombing, authorities were searching for two suspects. McVeigh was found but “John Doe 2” never was.
- Description of John Doe 2 came from a mechanic at the shop where the van had been rented.
- FBI determined later that the mechanic was confusing two memories. One of McVeigh and the other of a rental to two army men.

What underlies misattribution?

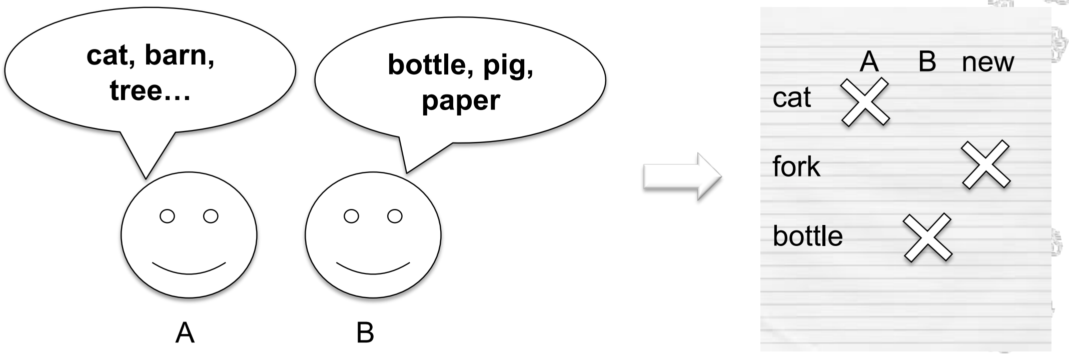
- “Memory binding problem”: have to correctly put together parts of a memory
  - people involved
  - what was said and done
  - where, when
- Parts may be processed and stored across various areas of the brain.
- Lots of examples of failure in everyday life.

Source Memory

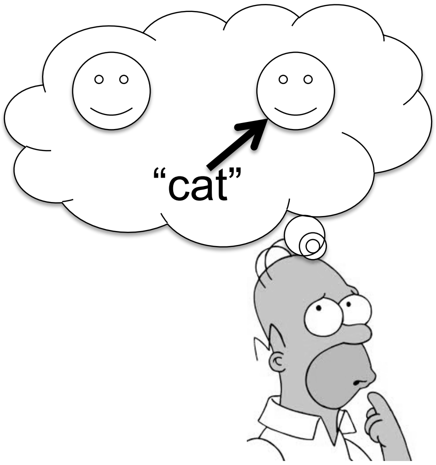
- Memory for contextual elements sometimes called **source memory**.
  - where you learned something
  - who told you something
- **Failures in source memory**:
  - can't differentiate between having actually done something and only having imagined it.
  - especially vulnerable to aging.
  - result from separation of content and source of memory

Source Memory: example

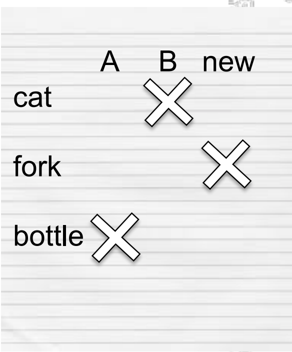
- **Encoding**: hear list of words spoken by one of two researchers
- **Retrieval**: surprise recognition test



Source Memory: example



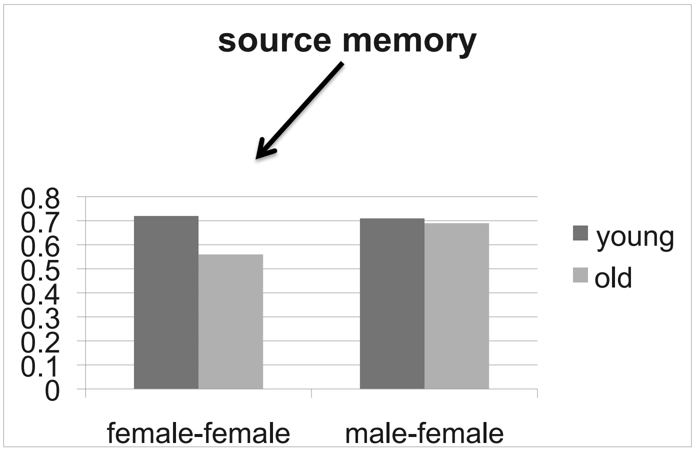
- **Source error**:
  - remember it is old
  - misremember source



	A	B	new
cat		✕	
fork			✕
bottle	✕		

Ferguson, et al., 1992

- **Older adults**: more difficulty with less distinct sources.



Source Memory

- Some suggest that certain, particularly traumatic, incidents are immune from forgetting of source information.
- These are called flashbulb memories. They are assumed to be stored as a whole.

Flashbulb Memories

- Examples: when President Kennedy was shot, when *Challenger* exploded, 9/11
    - people report very vivid memories of how they found out, with detailed context information
    - events with high levels of surprise and high levels of emotional arousal
- Scientists interviewed people right after events (e.g., *Challenger*) and years later.
    - people very confident in their memories (4.17/5) but many recollections very inaccurate (2.95/7)
- Much more accurate retention of information for an experienced event.

Memory conjunction errors

- Not just context information -- can actually blend objects together in memory.
- Example: learn a word list containing “spaniel” and “varnish” -- recall “spanish”.

- How do we avoid doing this all the time?
- Seem to have error-checking (“monitoring”) processes that try to verify. Such error-checking decreases with age.

Summary – Misattribution

- Memories are stored as parts
  - who, what, when, where
- Parts must be “bound together” during recollection.
- There is the potential for error in this process.
  - familiarity misattribution
  - source misattribution
  - conjunction errors
- Even happens for very salient events.
  - …even with flashbulb memories

“Seven Sins” of Memory (Schacter)

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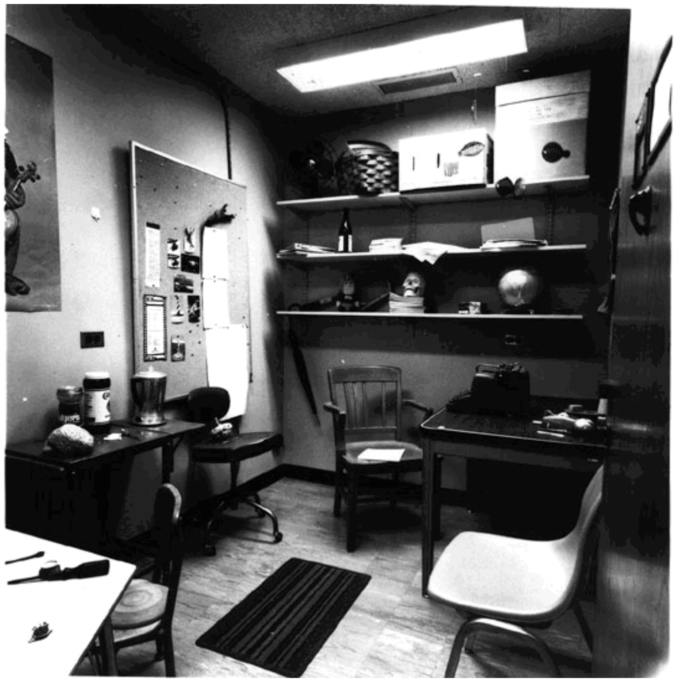
Memory as reconstructive

- A single memory has many parts that must be brought together at retrieval.
  - potential for misattribution
  - **suggests memories are re-constructed when they are recalled**
    - as opposed to simply “retrieved”
- Implications of reconstruction…
  - we “fill in” missing details
  - example: office experiment

Famous Office Experiment



- What did you see in the office (Brewer & Treyens, 1981)?
  - 9 out of 30 subjects reported seeing “books”, when there were none.
- Suggests subjects **reconstructed** their memory using a ***schema.***

Reconstruction and errors

- Can we “fill in” erroneously? Do we remember things that never happened?
- YES!
- Allow me to demonstrate . . .

Memory List 1

thread
sewing
prick
thorn
syringe
pin
sharp
thimble
hurt
cloth
eye
point
haystack
injection
knitting

Memory List 2

bed
tired
snooze
slumber
peace
rest
dream
blanket
snore
yawn
awake
wake
doze
nap
drowsy

Test List

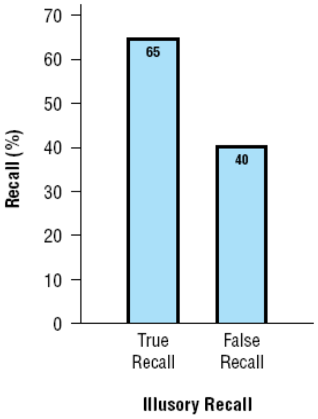
sewing
door
needle
sleep
candy
awake
blanket
paper

Test List

sewing -- YES
door -- NO
needle -- NO
sleep -- NO
candy -- NO
awake -- YES
blanket -- YES
paper -- NO

False Memories

- Deese/Roediger-McDermott (DRM) procedure.
- Lists consist of words which are highly related to another word (needle, sleep) that is not given.
- During test, there is a high rate of “false alarms” to these words.
- These “false memories” can be very vivid. People feel *certain* they have seen the words and will even give perceptual details about them.



In real life?

- El Al plane crash in Amsterdam in 1992.
  - dominant news story for some time
  - many pictures of crash site shown
- 10 months later, people’s memory for the event was tested.
  - asked “Did you see the television footage of the moment the plane hit the building?”
  - there were no photos/film of impact
- 2/3 of people reported having seen this footage and confidently described details.

Confidence ≠ Memory

- People often report high confidence for false memories
  - give detailed information despite the memory being false
- In telling juries how to evaluate eye witnesses, US Supreme Court has said that accuracy depends on
  - witness's certainty
  - his/her ability to describe suspect in detail
  - opportunity to view and pay attention to crime
  - time between incident and identification
- But studies show **NO** correlation between certainty and accuracy!

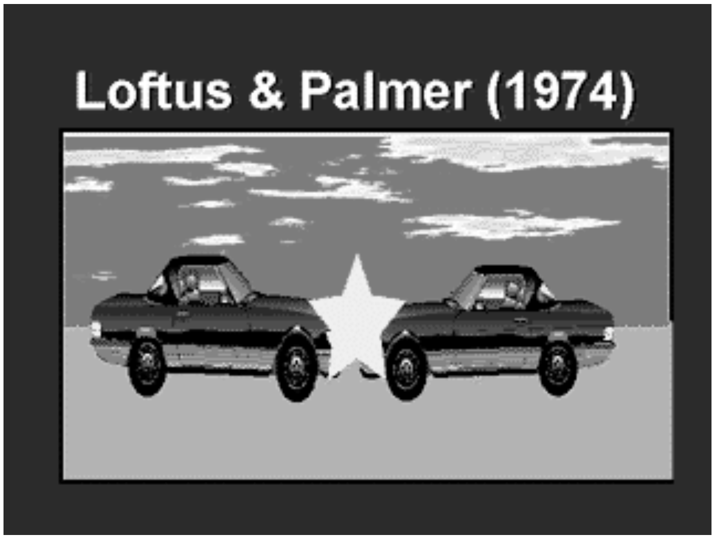
Eyewitness statistics

- Each year, approximately 75,000 criminal trials are decided on the basis of eyewitness testimony.
- Recently there was an analysis of 40 cases in which DNA evidence later established the innocence of wrongly-convicted individuals. In 36 of those (90%) there was a mistaken eyewitness identification.
- This is clearly an area where we need scientific studies and need the results of those studies to be applied if possible.

Suggestibility

- How we are questioned about our memories changes the memory itself.
- We tend to incorporate misleading information from external sources into our personal recollections.
  - A special kind of misattribution: mixing up our own memories with other things.
- Lots of issues here: influencing eye witnesses, creating false memories

Leading Questions/ Misinformation Effect



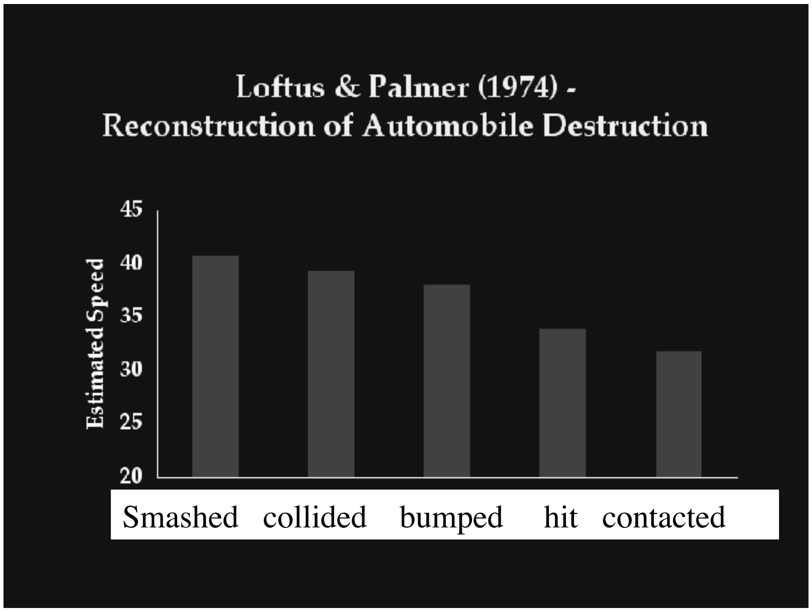
Leading Questions/ Misinformation Effect

- “About how fast were the cars going when they hit each other?”

vs.

- “About how fast were the cars going when they **smashed into** each other?”
  - “Smashed” group reports higher speed

How fast were the cars going when they ____ each other?



Suggestibility effects persist over time…

- One week later: Was there any evidence of broken glass?
  - Originally heard “hit”: 14% yes
  - Originally heard “smashed”: 32% yes

Seeing things . . .

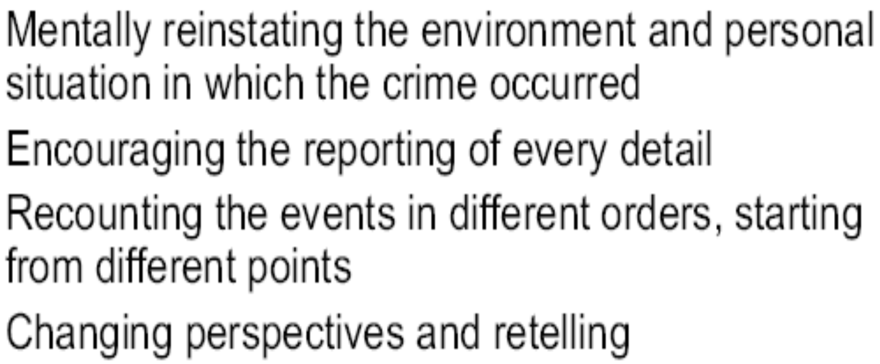
- Another example
  - See film of car going down country road. There is NO barn in the film.
  - Asked “How fast was the white car going when it passed the barn going down the country road?” or “How fast was the white car going down the country road?”
  - One week later, 17% of people report barn (compared to 3% without leading question).
  - People respond just as quickly and are just as confident in both cases.

Every word counts

- Suggestions can be very subtle:
  - (1) Did you see a tree?
  - (2) Did you see the tree?
  - More likely to report seeing a tree when asked (2) than (1).

How to do it right

- Cognitive interviewing:



Mentally reinstating the environment and personal situation in which the crime occurred

Encouraging the reporting of every detail

Recounting the events in different orders, starting from different points

Changing perspectives and retelling

What about hypnosis?

- In some cases, has helped people remember details (e.g., license plate).
- BUT, people are much more suggestible under hypnosis!

Extremes of suggestibility

- False confessions: through repeated questioning people come to have memories of a crime they did not commit.
  - Can show experimentally for more mundane events.

- False memories of childhood sexual abuse.
  - memories often recovered under hypnosis
  - very suggestive interviewing

False Childhood Memories

- Loftus and Pickerell asked subjects to try to remember childhood events (Loftus, 1997)
  - Presented one-paragraph stories about three events that had actually happened to him or her and one that had not.
  - Constructed the false event using information about a plausible shopping trip provided by a relative. The lost-in-the-mall scenario included the following elements: lost for an extended period, crying, aid and comfort by an elderly woman and, finally, reunion with the family.

False Childhood Memories

- The misinformation biased recollection of personal childhood events:
  - The participants recalled something about 49 of the 72 true events (68 percent) immediately after the initial reading of the booklet and also in each of the two follow-up interviews.
  - After reading the booklet, seven of the 24 participants (29 percent) remembered either partially or fully the false event constructed for them, and in the two follow-up interviews six participants (25 percent) continued to claim that they remembered the fictitious event.

Planting a memory is not that complicated …

- How many of you remember from your childhood:
  - Seeing Bugs Bunny at Disneyland or Disneyworld?
- Example false information effect (Braun, Ellis & Loftus, 2002; Grinley, 2002)
  - Subjects are exposed to fake ads for Disneyland featuring Bugs Bunny
    - *Bugs is a Warner Bros Character-- he is never at Disneyland!!*
  - ➢ Depending on the number of ad exposures, **16-36**% percent of subjects claimed to have *personally met Bugs at Disneyland.*

Who is susceptible?

- **More likely to generate false memories:**
  - if you have good visual imagery abilities
  - if you have poor source memory
  - if you *think* you have a good memory
  - if you are under hypnosis
  - if there is social pressure

Telling truth from falsehood

- Can we distinguish true memories from false memories?
- by a person's overt behavior?
  - NO, not so far
  - people behave as if they have in fact experienced these things
- with psychophysiological methods?
  - MAYBE, in some cases at least
  - eye movement patterns
  - ERPs
  - fMRI

Summary – Suggestibility

- Problem of suggestibility highlights that memory involves more than reactivating a "picture" in the mind.
- Must reconstruct memory:
  - stored past information
  - present cues
  - expectations
- Important to keep in mind that generally speaking we don't WANT to remember every detail of every event.

LTM Errors: Review

- What do retrieval errors tell us about the **process** of retrieval?
  - **Memories are stored in many separate parts**. Retrieval joins those parts together.
    - Familiarity error: misattributing familiarity of a memory
    - Source error: misremembering source of memory
  - **Retrieval is a re-constructive process**. Influenced by schemas, expectations.
    - Suggestibility errors: leading questions and misinformation introduce errors into recall

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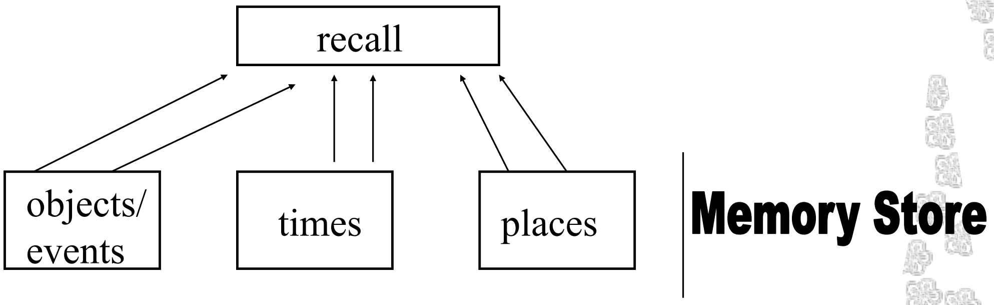
LTM: Review

- **types**: declarative, non-declarative
- **capacity**: possibly unlimited
- **encoding**: incidental vs. intentional
  - improves with repetition, elaboration, distinctiveness, consistency with recall state
- **retrieval**: recall vs. recognition; implicit vs. explicit
  - requires binding of separate parts
  - re-constructing memory
  - errors due to: blocking, misattribution, suggestibility

Consider this model of eyewitness memory:



recall

objects/ events

times

places

Memory Store

Which of the memory sins that we have discussed can this model explain (and how)? How might the model be altered to explain other sins?